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C-A OPERATIONS PROCEDURES MANUAL

15.5.4 Install/Remove Closed Dipole Magnet Chamber in AGS

(Vacuum Group Procedure VA-008.18.1.4)

Note: This document was formerly a C-A Group Procedure. The content of the group procedure was reviewed by the Technical Supervisor. All approvals and/or issue dates of the original group procedure are maintained for present use.

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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Approved: Signature on File
Collider-Accelerator Department Chairman Date

S. Gill

Vacuum Group Procedure VA-008.18.1.4
Original Issue Date: 01/01/00
Revision 01

****IMPORTANT****

PRIOR TO THE PERFORMANCE OF ANY WORK WITHIN THE SCOPE OF THIS PROCEDURE, IT IS THE RESPONSIBILITY OF THE SUPERVISOR TO ENSURE THAT ***WORK PLANNING*** HAS BEEN REVIEWED FOR THE PROTECTION OF WORKERS, EQUIPMENT, AND THE ENVIRONMENT.

1. **PURPOSE:**
 - 1.1 TO PROVIDE AN EFFECTIVE PROCEDURE FOR AGS VACUUM TECHNICIANS TO REMOVE AND INSTALL A "CLOSED" DIPOLE MAGNET CHAMBER.
2. **RESPONSIBILITIES:**
 - 2.1 THE AGS VACUUM SUPERVISOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION OF THIS PROCEDURE.
3. **DISCUSSION:**
 - 3.1 THIS PROCEDURE IS WRITTEN SO THAT TRAINED AGS VACUUM TECHNICIANS WILL BE ABLE TO SUCCESSFULLY AND EFFICIENTLY REMOVE AND/OR INSTALL A "CLOSED" DIPOLE MAGNET CHAMBER IN A SAFE AND PROPER MANNER.
4. **PRECAUTIONS:**
 - 4.1 THE TECHNICIAN SHALL BE AWARE OF RADIATION LEVELS IN THE AREA AND, WHERE REQUIRED, SHALL OBTAIN A RADIATION WORK PERMIT.
 - 4.2 THE TECHNICIAN WILL ENSURE THAT HE IS IN FACT USING A SAFE AND PROPERLY FUNCTIONING GAS REGULATOR AND BOTTLE CART. THOSE FOUND TO BE UNSAFE SHALL BE RETURNED FOR REPAIR.
 - 4.3 THE TECHNICIAN SHOULD BE AWARE OF WHAT CONSTITUTES A VACUUM SECTOR. FOR EXAMPLPE, SECTOR "AB" STARTS AT A 16 AND ENDS AT THE B3 MAIN MAGNET. SECTOR "B" STARTS AT B4 AND ENDS AT THE B13 MAIN MAGNET. A SCHEMATIC REPRESENTING THE ENTIRE AGS LAYOUT IS POSTED IN THE VACUUM LAB.
 - 4.4 THE TECHNICIAN SHALL NOT REMOVE ANY MATERIALS OR EQUIPMENT FROM THE AGS RING UNLESS THEY ARE FIRST CHECKED BY HEALTH PHYSICS.
 - 4.5 THE TECHNICIAN SHALL BE AWARE THAT UPON REMOVAL OF A HV CABLE FROM A S.I.P. WITHIN THE LOCKED OUT SECTOR, THE CABLE & CONNECTOR MUST BE PROPERLY DISCHARGED USING AN OSHA APPROVED RESISTIVE TYPE GROUNDING STICK.
 - 4.6 CHECK COLOR CODE ON KIRK KEY & VERIFY THAT IT MATCHES THAT OF THE HV CABLES IN THE LOCKED OUT SECTOR.
5. **PREREQUISITES:**
 - 5.1 THE TECHNICIAN WILL HAVE BEEN TRAINED IN THIS PROCEDURE.
 - 5.2 LOCKOUTITAGOUT15.17.00.02
 - 5.3 ELECTRICAL SAFETY 15.17.00.04
 - 5.4 AGS RING ACCESS TRAINING
 - 5.5 ACTIVATION WORKER TRAINING (BNL OH&S GUIDE 3.5.0)
 - 5.6 SAFETY GLASSES ARE REQUIRED DURING THIS PROCEDURE.
 - 5.7 WHITE LINT-FREE GLOVES ARE REQUIRED DURING THIS PROCEDURE.
 - 5.8 A HARD HAT IS REQUIRED DURING THIS PROCEDURE.

- 5.9 TECHNICIAN HAS BEEN TRAINED TO AT LEAST A LEVEL OF KNOWLEDGEABLE IN LOITO AGSIHEBT VACUUM ION PUMP POWER DISCONNECT
- 5.10 AFFECTED PERSONS TRAINING 15.12.00.01
- 5.11 FLUKE METER OR EQUAL, CAPABLE OF READING OHMS 5.12 OSHA APPROVED RESISTIVE TYPE GROUNDING STICK

6. OPERATIONAL PROCEDURE FOR REMOVAL:

- 6.1 ENSURE THAT A RADIATION SURVEY HAS BEEN DONE BY THE HP GROUP OF THE AREA TO BE WORKED IN.
- 6.2 CLOSE SECTOR VALVES AND DISCONNECT POWER TO THOSE VALVES *UIS* AND *DIS* OF SECTOR TO BE VENTED.
- 6.3 PERFORM LOITO PROCEDURES FOR ION PUMP HV SUPPLIES
- 6.4 PERFORM LOITO PROCEDURES FOR SECTOR CCG.
- 6.5 VENT SECTOR TO ATMOSPHERE AS PER PROCEDURE #8.18.1.1
- 6.6 CHECK WITH MAINT. COORDINATOR TO SEE IF SURVEY REQUIRED FOR THIS PROCEDURE.
- 6.7 REMOVE FLANGE R-C NETWORKS AND/OR SHORTING BARS.
- 6.8 REMOVE CLAMPS, RETAINERS AND SEALS.
- 6.9 PROTECT FLANGES BEFORE REMOVAL BY CRANE.
- 6.10 SCRAP SEALS IN "YELLOW RADIATION WASTE BARRELS IN RING.
- 6.11 WHERE NECESSARY, REMOVE P.U.E. ELECTRICAL CABLE. (ED GILL)
- 6.12 VERIFY WITH A FLUKE METER THAT THE GREEN GROUND CABLE WHICH IS BOLTED TO THE S.I.P. MAGNET BODY HAS CONTINUITY TO RING GROUND.
- 6.13 AFFIX OSHA APPROVED GROUND STICK TO THE GREEN GROUND CABLE WHICH IS BOLTED TO THE S.I.P. MAGNET BODY.
- 6.14 USING THE GROUND STICK, GROUND THE CENTER CONDUCTOR OF THE HV CABLE.
- 6.15 USING THE GROUND STICK, GROUND THE HV FEED-THRU OF THE S.I.P.
- 6.16 REMOVE ION PUMP HV CABLE AND GROUND CABLE.
- 6.17 DISCONNECT WATER SUPPLY (WATER GROUP).
- 6.18 DISCONNECT POWER BUS (POWER GROUP).
- 6.19 WHERE NECESSARY, REMOVE MAGNET BRIDGE LADDER (BEAM COMPONENTS).
- 6.20 REMOVE MAIN MAGNET FROM GIRDER (RIGGERS ASSIST).
- 6.21 REMOVE GREEN COVER FROM MAIN MAGNET & PLACE COVER NUTS ON STUDS.
- 6.22 REMOVE BOLTS OR CLAMP FROM ION PUMP & STORE SAFELY.
- 6.23 SCRAP ION PUMP SEAL IN "YELLOW RADIATION WASTE BARREL BUT SAVE THE RETAINER & STORE SAFELY.
- 6.24 REMOVE MAGNET CHAMBER R-C NETWORK & PLACE ON TOP OF MAIN MAGNET.
- 6.25 REMOVE CHAMBER SUPPORT BRACKETS & PLACE BRACKETS ON TOP OF MAIN MAGNET & PUT BOLTS BACK IN MAGNET FINGER TIGHT.

- 6.26 REMOVE OVAL FLANGE FROM CHAMBER
 - COVER END OF CHAMBER WITH CAP OR FOIL
 - COVER OVAL FLANGE WITH RUBBER BOOT
 - SCRAP FLANGE BOLTS IN "YELLOW RADIATION WASTE BARREL
- 6.27 REMOVE CHAMBER BY CAREFULLY SLIDING OUT THROUGH *DIS* END OF MAIN MAGNET.
- 6.28 TAKE RADIATION "SMEAR" OF CHAMBER AND TAG APPROPRIATELY (H-P).
- 6.29 FILL IN & ATTACH CHAMBER TRAVELER.
- 6.30 TRANSPORT CHAMBER (IF NECESSARY) TO BLDG.975 FOR RE-WORK (RIGGERS)
- 6.31 IF GOING TO BLDG.975, LOG OUT IN RING BOOK & INTO BLDG.975 BOOK.

7. OPERATIONAL PROCEDURE FOR INSTALLATION:

- 7.1 REMOVE CHAMBER TRAVELER SHEET AND CAREFULLY SLIDE CHAMBER INTO MAIN MAGNET FROM DIS END.
- 7.2 INSTALL CHAMBER SUPPORT BRACKETS (USE CHAMBER LOCATING FIXTURE).
- 7.3 INSTALL MAGNET CHAMBER R-C NETWORK & CHECK FOR SHORTS.
- 7.4 ATTACH ION PUMP TO CHAMBER WITH NEW SEAL & CLAMP (OR BOLTS) AND CHECK FOR SHORTS.
- 7.5 CHECK P.U.E. FOR CAPACITANCE & SHORTS (ED GILL).
- 7.6 INSTALL OVAL FLANGE & NEW SEAL AS PER PROCEDURE #8.18.1.48
- 7.7 PUMP DOWN CHAMBER WITH PORTABLE TURBO AND LEAK CHECK.
- 7.8 CHECK CHAMBER FOR SHORTS (EL. GROUP).
- 7.9 VENT CHAMBER WITH N2 & COVER END FLANGES WITH RUBBER BOOTS.
- 7.10 RETURN MAIN MAGNET TO GIRDER (RIGGERS ASSIST).
- 7.11 SURVEY MAIN MAGNET (SURVEY GROUP).
- 7.12 INSTALL MAGNET BRIDGE LADDER WHERE NECESSARY (BEAM COMPONENTS).
- 7.13 RE-CONNECT WATER (WATER GROUP).
- 7.14 RE-CONNECT POWER BUS (POWER GROUP).
- 7.15 RE-CONNECT ION PUMP HV CABLE & GROUND CABLE.
- 7.16 INSTALL NEW CLAMPS & SEALS AS PER PROCEDURE #8.18.1.6
- 7.17 CHECK CHAMBER FOR SHORTS (EL GROUP).
- 7.18 START ROUGHING AND LEAK CHECK PROCEDURE #8.18.1.20
- 7.19 CHECK P.U.E. FOR CAPACITANCE & SHORTS & INSTALL CABLE (ED GILL).
- 7.20 INSTALL FLANGE R-C NETWORKS & SHORTING BARS.
- 7.21 REMOVE RED TAGS FROM ION PUMP P.S. AND CCG.
- 7.22 PROCEED WITH SECTOR START-UP PROCEDURE #8.18.1.53
- 7.23 UPDATE CHAMBER TRAVELER & RETURN TO VACUUM LAB FILE.

8. ACCEPTANCE CRITERIA:

8.1 CHAMBER HAS BEEN REMOVED AND/OR INSTALLED AND SECTOR HAS ACHIEVED VACUUM INTEGRITY.

9. FINAL CONDITIONS:

9.1 WORK AREA HAS BEEN CLEANED AND ALL EQUIPMENT AND/OR TOOLS HAVE BEEN REMOVED FROM THE RING AFTER BEING CHECKED BY H-P PERSONNEL.

9.2 DOSIMETER READINGS HAVE BEEN LOGGED IN THE DOSIMETER LOG BOOK LOCATED IN THE VACUUM LAB.

9.3 CHAMBER TRAVELER HAS BEEN UPDATED & RETURNED TO VACUUM LAB FILE.